

# JAPAN

## EDICT OF GOVERNMENT

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JIS B 6518 (1990) (English): Test methods for performance and accuracy of moulding machine

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*The citizens of a nation must  
honor the laws of the land.*

Fukuzawa Yukichi

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# JIS

## JAPANESE INDUSTRIAL STANDARD

Test methods for  
performance and accuracy  
of moulding machine

JIS B 6518—1990

Translated and Published

by

Japanese Standards Association

In the event of any doubt arising,  
the original Standard in Japanese is to be final authority.

## JAPANESE INDUSTRIAL STANDARD

J I S

Test methods for performance and  
accuracy of moulding machine

B 6518-1990

1. Scope

This Japanese Industrial Standard specifies test methods for performance and rigidity, and inspection method for static accuracy and working accuracy of moulding machine.

Remarks 1. The moulding machine consists of rotating plural lateral plane shell, vertical plane shell (inclined plane shell) and automatic feed apparatus and means the planing and moulding machine which cuts an optional section shape by fixing the main table <sup>(1)</sup>, capable of travelling in right and left, up and down or inclining the shell of plane and by feeding linearly the work pieces.

2. The applicable Standards to this Standard are shown in the following:

JIS B 6507-General Code of Safety for Woodworking Machinery

JIS B 6521-Method of Measurement for Noise Emitted by Woodworking Machinery

3. The corresponding International Standard to this Standard is shown as follows.

ISO 7947-Woodworking machines - Two-, three- and four-side moulding machines - Nomenclature and acceptance conditions

4. In this Standard the units and numerical values shown in { } are in accordance with traditional units and, appended for informative reference.

Note <sup>(1)</sup> In case where the main table is not independent, it means the surface place total body.

2. Function Test Methods

The function tests of moulding machine shall be in accordance with Table 1.

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Reference Standards:

JIS B 6501-Test Code for Performance and Accuracy of Wood Working Machinery

JIS Z 8203-SI Units and the Use of their Multiples and of Certain other Units

Table 1. Function Test

| Num-ber | Test item   | Measuring method  |
|---------|---|---|
| 1       | Electric apparatus  | Before and after operating test, carry out the insulation condition test each once.   |
| 2       | Starting, stopping and of main shaft and running operation  | At a suitable rotary speed of main shaft, repeat the starting and stopping ten times and test the smoothness and security of actuation.   |
| 3       | Converting operation of rotary speed of main shaft  | Relating to all marked rotary speeds convert the main shaft rotary speed, and test the smoothness of actuation of operating apparatus and security of indication.   |
| 4       | Starting, stopping and running operation of carriage  | At a suitable feed speed, carry out the starting, stopping repeatedly ten times, and test smoothness and security of actuation.   |
| 5       | Converting operation of feed speed  | Convert the speeds relating to marked all feed speeds and three feed speeds of the lowest, medium and the highest, test the smoothness of actuation and security of indication of operation apparatus.  |
| 6       | Operation of hand feed  | Test the smoothness and uniformity of actuation over the whole length of motion according to hand feed handle, and rotate the micro-hand-feed handle several times and test the smoothness and uniformity.  |
| 7       | Operations of right-and-left travelling, up-and-down travelling, and clamping as well as automatic stopping operation | Move the main shaft in right-and-left, up-and-down or incline, test the smoothness and uniformity of actuation over the whole length of moving, and at the middle and both ends of moving, test the security of clamping and smoothness of actuation of clamping apparatus. Further, at both ends of moving, test the smoothness and security of actuation of automatic stopping apparatus. |
| 8       | Actuating operation of movable part   | Relative to the movable range of moving, test the security and smoothness of actuation.   |
| 9       | Attaching and detaching of plane blade and cutter   | Test the smoothness and security of attaching and detaching of plane blade and cutter as well as of fastening screws.   |
| 10      | Pressurizing apparatus  | Test the smoothness and security of function.   |
| 11      | Safety device   | Test the security of safety function and machine-protective function to the worker (Refer to JIS B 6507).   |
| 12      | Lubricating apparatus   | Test the security of function such as oil tightness, suitable distribution of oil quantity, etc.  |
| 13      | Oil hydraulic apparatus   | Test the security of function such as oil tightness, pressure regulation, etc.  |
| 14      | Pneumatic apparatus   | Test the security of function such as air tightness, pressure regulation, etc.  |
| 15      | Accessories   | Test the security of function.  |

Remark: In a moulding machine without the function, the test item corresponding thereto in Table 1 is omitted.

### 3. Running Test Method

3.1 No-load Running Test Rotate each main shaft, continue the running for 30 to 60 min, after the bearing temperature has been stabilized, measure the required electric power and noise, and record relating to each item specified in Record Format 1 of Table 2 as well as observe that there is no abnormal vibration by feeling.

Further, measure the noise according to JIS B 6521.

Table 2. Record Format 1

| Num-<br>ber | Meas-<br>uring<br>time | Name of<br>plane shell        | Rotary speed<br>of main shaft |              | Temperature °C        |  |                          | Required elec-<br>tric power |                       |                      | Noise<br><br>dB<br>(A) | Descrip-<br>tion |
|-------------|------------------------|-------------------------------|-------------------------------|--------------|-----------------------|--|--------------------------|------------------------------|-----------------------|----------------------|------------------------|------------------|
|             |                        |                               | min <sup>-1</sup> {rpm}       |              | Main shaft<br>bearing |  | Room<br>temper-<br>ature | Vol-<br>tage<br><br>V        | Cur-<br>rent<br><br>A | In-<br>put<br><br>kW |                        |                  |
|             | Mark-<br>ing           |                               | Actual<br>mea-<br>suring      | Left<br>(up) | Right<br>(down)       |  |                          |                              |                       |                      |                        |                  |
|             | h min                  |                               |                               |              |                       |  |                          |                              |                       |                      |                        |                  |
|             |                        | Upper lateral<br>plane shell  |                               |              |                       |  |                          |                              |                       |                      |                        |                  |
|             |                        | Lower lateral<br>plane shell  |                               |              |                       |  |                          |                              |                       |                      |                        |                  |
|             |                        | Left vertical<br>plane shell  |                               |              |                       |  |                          |                              |                       |                      |                        |                  |
|             |                        | Right vertical<br>plane shell |                               |              |                       |  |                          |                              |                       |                      |                        |                  |
|             |                        |                               |                               |              |                       |  |                          |                              |                       |                      |                        |                  |

- Remarks 1. In the case where speed change gear of rotary speed of main shaft, record relating to rotary speed of at least two levels containing the maximum rotary speed.
2. Relating to the noise measuring conditions, record in the description column.
3. Measurement of other than noise shall be carried out relating to all plane shells individually.
4. Name of plane shell may be altered according to machine type.

3.2 Loading Running Test Carry out cutting of test member, measure the required electric power and noise, record relating to each item specified in Record Format 2 of Table 3 as well as observe that there is no abnormal vibration and the condition of cut surface by feeling.

For measuring of required electric power, make the feed speed constant, change the thickness of test member or cut depth, or make the thickness of test member or cut depth the definite value, and change the feed speed to carry out the test.

Table 3. Record Format 2

| Number | Test member  |             |                 |                                   | Tool               |                               |              |             |                 |             | Cutting conditions          |  |                        |                     |                     | Required electric power |              |              |                        |                     | Noise<br>dB<br>(A) | Description |                                       |
|--------|--------------|-------------|-----------------|-----------------------------------|--------------------|-------------------------------|--------------|-------------|-----------------|-------------|-----------------------------|--|------------------------|---------------------|---------------------|-------------------------|--------------|--------------|------------------------|---------------------|--------------------|-------------|---------------------------------------|
|        | Dimensions   |             |                 | Kind of tree or<br>kind of member | Water content<br>% | Name of<br>plane shell        | Length<br>mm | Width<br>mm | Thickness<br>mm | Blade shape | Material of<br>cutting edge | Rotary speed of<br>main shaft<br>$\frac{\text{m}}{\text{min}}^{-1}$<br>{rpm} | Cutting speed<br>m/min | Feed speed<br>m/min | Cutting depth<br>mm | Cutting width<br>mm     | Voltage<br>V | Current<br>A | Input                  |                     |                    |             |                                       |
|        | Length<br>mm | width<br>mm | Thickness<br>mm |                                   |                    |                               |              |             |                 |             |                             |  |                        |                     |                     |                         |              |              | No load<br>$P_0$<br>kW | Load<br>$P_1$<br>kW |                    |             | Cutting<br>power<br>$P_1 - P_0$<br>kW |
|        |              |             |                 |                                   |                    |                               |              |             |                 |             |                             |  |                        |                     |                     |                         |              |              |                        |                     |                    |             |                                       |
|        |              |             |                 |                                   |                    | Upper lateral<br>plane shell  |              |             |                 | Attached    |                             |  |                        |                     |                     |                         |              |              |                        |                     |                    |             |                                       |
|        |              |             |                 |                                   |                    | Lower lateral<br>plane shell  |              |             |                 |             |                             |  |                        |                     |                     |                         |              |              |                        |                     |                    |             |                                       |
|        |              |             |                 |                                   |                    | Left vertical<br>plane shell  |              |             |                 |             |                             |  |                        |                     |                     |                         |              |              |                        |                     |                    |             |                                       |
|        |              |             |                 |                                   |                    | Right vertical<br>plane shell |              |             |                 |             |                             |  |                        |                     |                     |                         |              |              |                        |                     |                    |             |                                       |

- Remarks 1. Relating to cutting direction of test member and noise-measuring conditions, record on the description column.
2. For blade shape, indicate in a drawing and describe the main dimensions.
3. Measurements other than noise shall be carried out on all plane shells individually.
4. Name of plane shell may be altered according to machine type.

#### 4. Rigidity Test Method

The rigidity test of moulding machine shall be in accordance with Table 4.

Table 4. Rigidity Test

| Num-ber | Test item  | Measuring method   | Measuring method diagram |
|---------|--|--|--------------------------|
| 1       | Bending rigidity of main shaft series              | <p>Apply the stationarily placed test indicator to the tip end part (side surface) of main shaft, apply <sup>(2)</sup> a load (P) in the direction at right angles with the main shaft, and measure the deflection of main shaft.</p> <p>Carry out <sup>(3)</sup> this measurement by applying the load in two directions at 90° mutually.</p> |                          |
| 2       | Integrated rigidity of upper plane shell and table | <p>Apply the test indicator fixed on the upper surface of table to the upper plane shell, add <sup>(4)</sup> the load (P) in vertical direction between the upper plane shell and the upper surface of table, and measure the relative displacement between the main shaft and the upper surface of table.</p>                                 |                          |

Notes <sup>(2)</sup> Allow the position to apply the load to be at as near position as far as possible to the main shaft end, and record the distance from the main shaft end.

<sup>(3)</sup> In the case where the main shaft or main shaft sleeve is raised and lowered, fix at the middle part of the motion and carry out the measurement.

<sup>(4)</sup> Make the position to add load the middle part of plane shell as far as possible, and record the distance from the main shaft end.

Remarks 1. The rigidity test of the same design machine may be represented by test result carried out on the representative one unit and the results for others may be omitted.

2. The load (P) shall be the size recommended by the manufacturer and the value, recorded.

3. This measurement shall be carried out by rotating the main shaft and after the bearing temperature has been stabilized.

## 5. Static-Accuracy Inspection Method

The static-accuracy inspection of moulding machine shall be in accordance with Table 5.

Table 5. Static-Accuracy Inspection

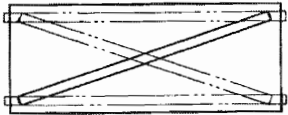
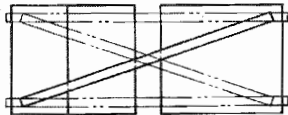
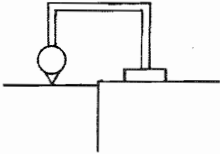
| Unit: mm    |  |   |   |                      |
|-------------|--|---|---|----------------------|
| Num-<br>ber | Inspection item                              | Measuring method  | Measuring method diagram  | Permissible<br>value |
| 1           | Straightness of upper surface of each table  | Place a straightedge on the diagonal line and longitudinal direction on the upper surface of table, measure the clearance with a feeler gauge and take the maximum value as the measured value <sup>(5)</sup> .   |    | 0.10 per 1000        |
| 2           | Alignment of upper surface of each table     | Place a straightedge on the diagonal line and in the longitudinal direction so as to straddle on the upper surfaces of neighboring tables, measure the clearance with a feeler gauge and take the maximum value as the measured value <sup>(5)</sup> .  |    | 0.10 per 1000        |
| 3           | Alignment in lateral direction of each table | Relating to each table, place a test indicator on the upper surface of table, apply this to the upper surfaces of neighboring front and rear tables, travel in lateral direction, and take the maximum difference of readings of respective readings of test indicator as the measured value. |  | 0.03                 |

Table 5 (Continued)

Unit: mm

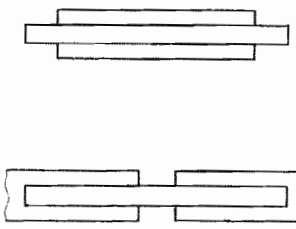
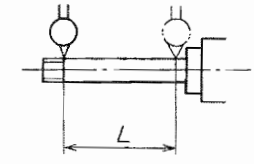
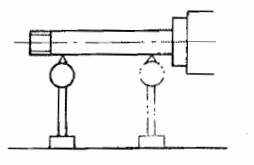
| Num-ber | Inspection item   | Measuring method   | Measuring method diagram  | Permissible value                         |
|---------|---|--|---|---|
| 4       | Straightness and alignment of edge surface                | Place a straightedge on the edge surface or so as to straddle each edge surface, measure the clearance with a feeler gauge, and take the maximum value as the measured value <sup>(5)</sup> .  |    | 0.10 per 1000                             |
| 5       | Run-out of lateral spindle                                | Apply a test indicator to both ends of lateral spindle, rotate the lateral spindle manually and take the larger out of the maximum differences of readings of indicator during rotating as the measure value.                        |    | $L < 150$<br>0.02<br>$L \geq 150$<br>0.03 |
| 6       | Parallelism of upper surface of table and lateral spindle | Place a test indicator on the upper surface of reference table <sup>(6)</sup> , apply this to the lateral spindle, and take the maximum difference of readings of test indicator at both ends as the measured value <sup>(7)</sup> . |  | 0.05                                      |

Table 5 (Continued)

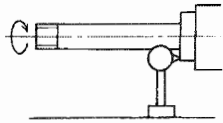
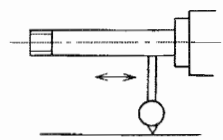
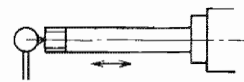
| Num-<br>ber | Inspection item   | Measuring method   | Measuring method diagram   | Unit: mm             |
|-------------|---|--|--|----------------------|
|             |   |  |  | Permissible<br>value |
| 7           | Run-out in spindle direction of shell attaching surface of lateral spindle          | Apply a test indicator to the shell attaching surface of lateral spindle, rotate the lateral spindle manually, and take the maximum difference of readings of test indicator during rotating as the measured value.  |   | 0.01                 |
| 8           | Parallelism of moving of lateral spindle with respect to the upper surface of table | Apply the test indicator fixed with the lateral spindle to the upper surface of reference table <sup>(6)</sup> , travel the lateral spindle by the maximum travel amount, and take the maximum difference of readings of test indicator during travelling as the measured value. |   | 0.04                 |
| 9           | Moving of lateral spindle in axial direction  | Apply a test indicator to the tip of lateral spindle, swing <sup>(8)</sup> the lateral spindle in axial direction and take the maximum difference of readings of test indicator as the measured value.   |  | 0.05                 |

Table 5 (Continued)

Unit: mm

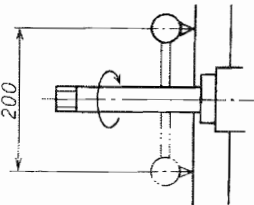
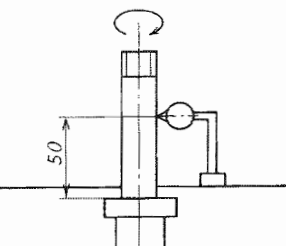
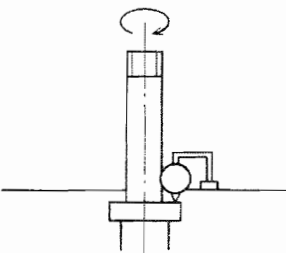
| Num-<br>ber | Inspection item   | Measuring method  | Measuring method diagram  | Permissible<br>value                       |
|-------------|---|---|---|--|
| 10          | Squareness of lateral spindle with respect to edge                          | Apply the test indicator fixed with the lateral spindle to the edge to shake around and take the maximum difference of readings of test indicator as the measured value.  |    | Relating to shaking-around diameter<br>200 |
| 11          | Run-out of vertical spindle   | Apply a test indicator at the position of 50 mm from the flange surface of vertical spindle, rotate the vertical spindle manually, and take the maximum difference of readings of test indicator during rotation as the measured value. |   | 0.02                                       |
| 12          | Run-out of shell-attaching surface of vertical spindle in spindle direction | Apply a test indicator to shell-attaching surface of vertical spindle, rotate the vertical spindle manually, and take the maximum difference of readings of test indicator during rotating as the measured value.                       |  | 0.01                                       |

Table 5 (Continued)

Unit: mm

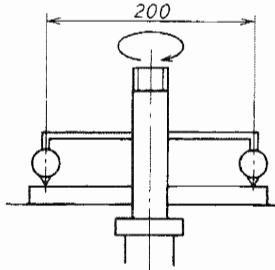
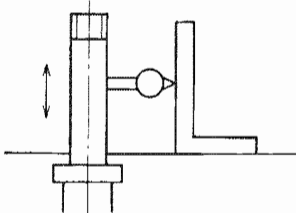
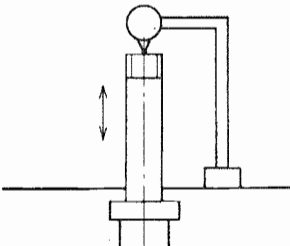
| Num-ber | Inspection item   | Measuring method   | Measuring method diagram  | Permissible value                               |
|---------|---|--|---|---|
| 13      | Squareness of vertical spindle with respect to table                                    | Place a square on the upper surface of vertical spindle table or upper surface of main table, apply a test indicator fixed with the vertical spindle to the upper surface of table, shake around and take the maximum difference of readings of test indicator as the measured values.   |    | Relating to shaking-around diameter 200<br>0.10 |
| 14      | Squareness of up/down motion of vertical spindle with respect to upper surface of table | Apply a test indicator fixed with the vertical spindle to the square stationarily placed <sup>(9)</sup> on the upper surface of table, travel by the maximum travelling amount of vertical spindle, and take the maximum difference of readings of test indicator as the measured value. |    | 0.05  |
| 15      | Moving in axial direction of vertical spindle   | Apply a test indicator to the tip of vertical spindle, shake <sup>(8)</sup> the vertical spindle in axial direction and take the maximum difference of readings of test indicator as the measured value.   |  | 0.05  |

Table 5 (Continued)

Unit: mm

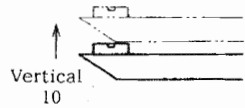
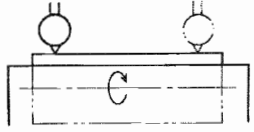
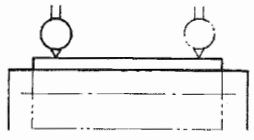
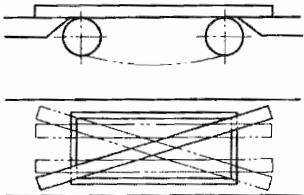
| Num-ber | Inspection item                             | Measuring method   | Measuring method diagram   | Permissible value |
|---------|---|--|--|-------------------|
| 16      | Parallelism of up and down motions of table | Place precision levels on the upper surface of front table parallelly and perpendicularly to main spindle, raise approximately 10 mm from the lowering position, and take the maximum difference of readings of precision level during it as the measured value. |   | 0.06/m            |
| 17      | Run-out of table roll                       | Apply a test indicator to both ends of table roll, rotate the table roll by hand, and take the maximum difference of readings of test indicator as the measured value.   |   | 0.05              |
| 18      | Parallelism of table and table roll         | Place a test indicator on the upper surface of table behind the table roll and take the maximum difference of readings of test indicator at the most upper part of both ends of table roll as the measured value.  |  | 0.05              |

Table 5 (Continued)

| Unit: mm |  |  |   |                   |
|----------|--|--|---|-------------------|
| Num-ber  | Inspection item  | Measuring method   | Measuring method diagram  | Permissible value |
| 19       | Parallelism of feeding-in caterpillar on the roll to the table | Place a straightedge on the diagonal line and both ends so as to straddle the table and the upper part of feed-in caterpillar on the roll, measure the clearance between the upper most part of caterpillar and the straightedge with a feeler gauge and take the maximum value as the measured value <sup>(5)</sup> . |  | 0.20 per 1000     |

Notes <sup>(5)</sup> In case where the measuring distance is smaller than the reference, convert the numerical value of permissible value in proportion to the distance. In this case, unless specially designated, in case where the numerical value of converted permissible value is less than 0.005 mm, take as 0.005 mm.

<sup>(6)</sup> The reference table means in upper lateral spindle the just under table and in lower lateral spindle the behind table.

<sup>(7)</sup> In this measurement, relating to the overall length of lateral spindle carry out by taking the position most little in run-out as the reference.

<sup>(8)</sup> The shaking force in axial direction is to be approximately 150 N {approximately 15 kgf}.

<sup>(9)</sup> The stationarily placed positions are to be two portions intersecting perpendicularly mutually.

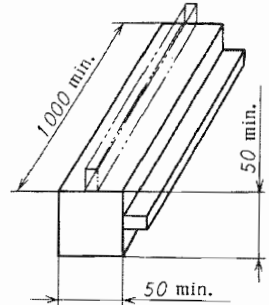
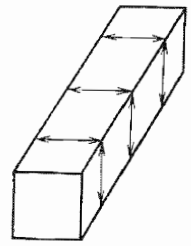
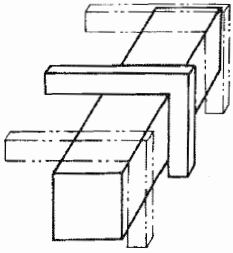
Remark: In the case of moulding machine having not the function, the inspection corresponding thereto in Table 5 shall be omitted.

#### 6. Inspection Method for Working Accuracy

The inspection for working accuracy of moulding machine shall be in accordance with Table 6.

Table 6. Inspection for Working Accuracy

Unit: mm

| Number | Inspection item                                       | Measuring method   | Measuring method diagram  | Permissible value |
|--------|---|--|---|-------------------|
| 1      | Straightness in longitudinal direction of cut surface | Cut the four sides of test member place straightedges of 1000 mm on the cut surfaces in oposition, measure the clearance with feeler gauge and take the maximum value as the measured value.   |    | 0.30 per 1000     |
| 2      | Accuracy of width and thickness of cut surface        | Measure the width and thickness at the middle and both ends of above-mentioned test member with a vernier calipers and take the maximum difference as the measured value.  |   | 0.10              |
| 3      | Squareness of cut surfaces                            | Apply a square to neighboring two surfaces of above-mentioned test material and measure the clearance with a feeler gauge. Carry out this measurement at three places of the middle, and both ends of test member, and take the maximum value as the measured value. |  | 0.10 per 50       |

Remark: Carry out preliminarily the required preworking to the test member.

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Edition 1

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